

# WEATHER AND CIRCULATION OF NOVEMBER 1972

## Another Cold, Wet Month

**ROBERT R. DICKSON**—National Meteorological Center, National Weather Service, NOAA, Suitland, Md.

### 1. MEAN CIRCULATION

During November 1972, relatively fast westerlies prevailed at middle and low latitudes, and amplified ridges were observed near the North Pole and over Alaska (figs. 1, 2). The magnitude of the height anomaly in both the Arctic ridge and the central United States trough was unusual, approximating three standard deviations.

This pattern evolved (fig 3) from October's deep, high-latitude Lows and fast polar westerlies (Taubensee 1973). The midlatitude Pacific westerlies, which had been weak in October, were greatly energized during November

(fig. 4) as cold air was driven to the Asiatic coast, sharpening thermal gradients and increasing the supply of available potential energy. Wind speeds were more than 5 m/s stronger than normal from the coast of China to the mid-Pacific. As the Pacific westerlies increased, circulation features from the east Pacific to the central Atlantic moved eastward. Mean troughs were observed in the mid-United States and off the east coast with a mean ridge over western Canada and Alaska. The midtropospheric westerlies over the United States were strong and displaced well south of normal; they were associated with a similar displacement of the storm track.

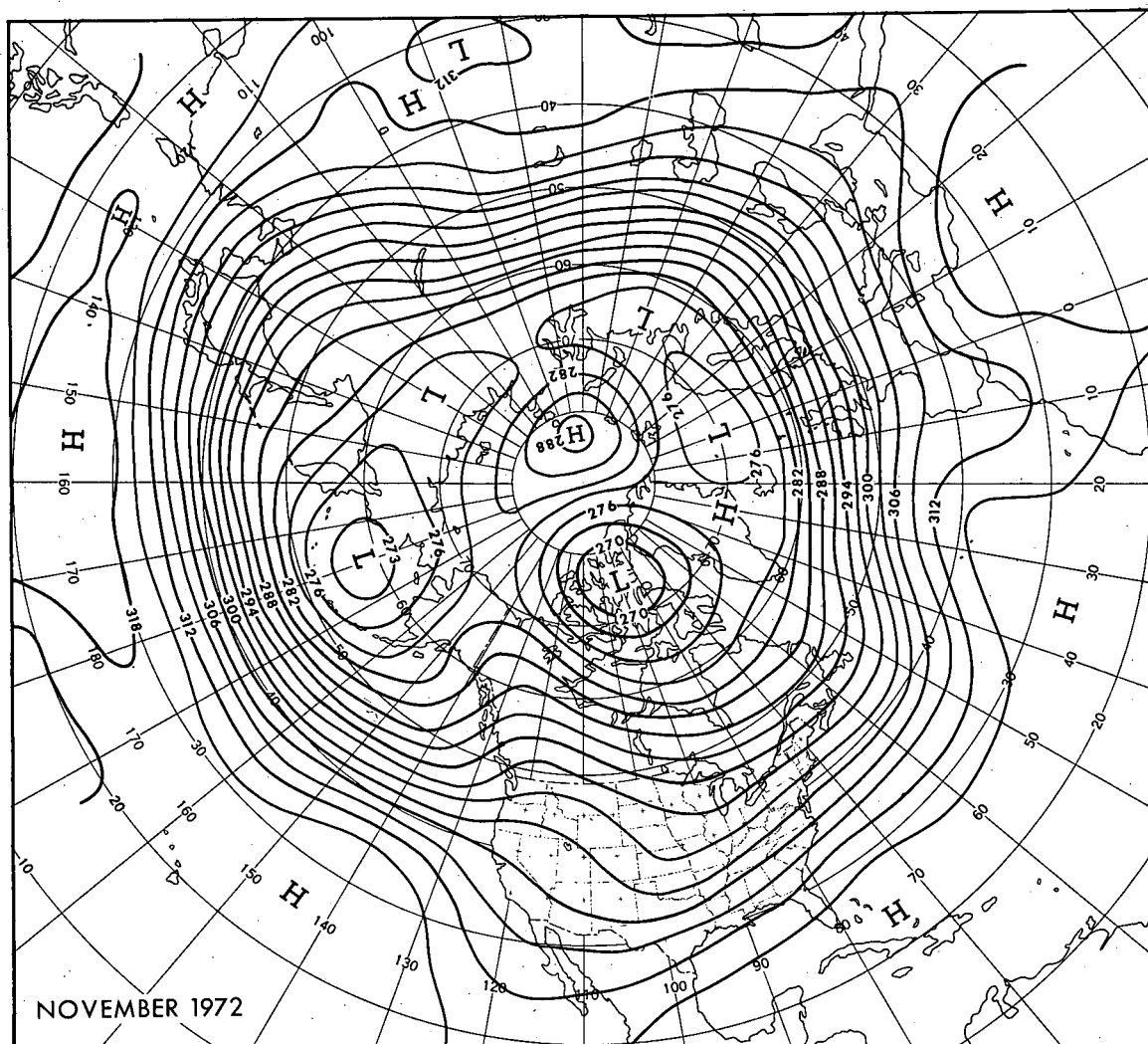


FIGURE 1.—Mean 700-mb contours in dekameters (dam) for November 1972.

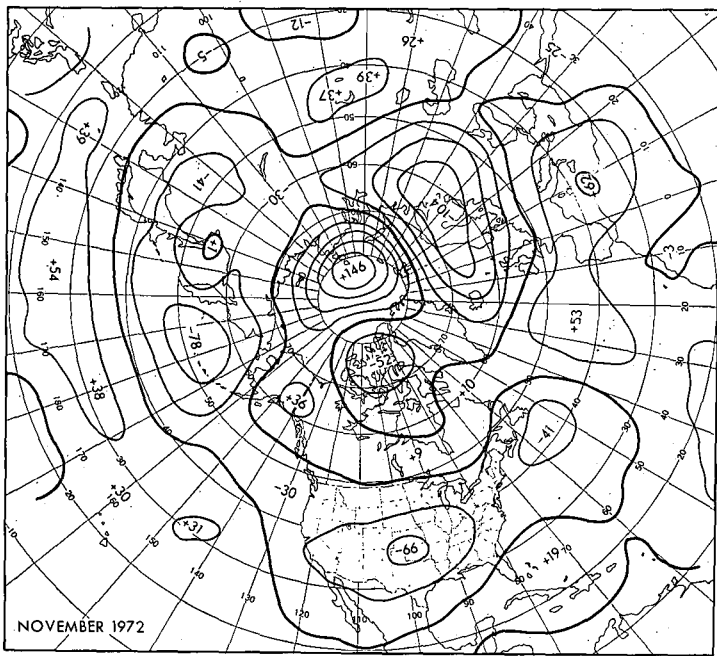


FIGURE 2.—Departure from normal of mean 700-mb height in meters (m) for November 1972.

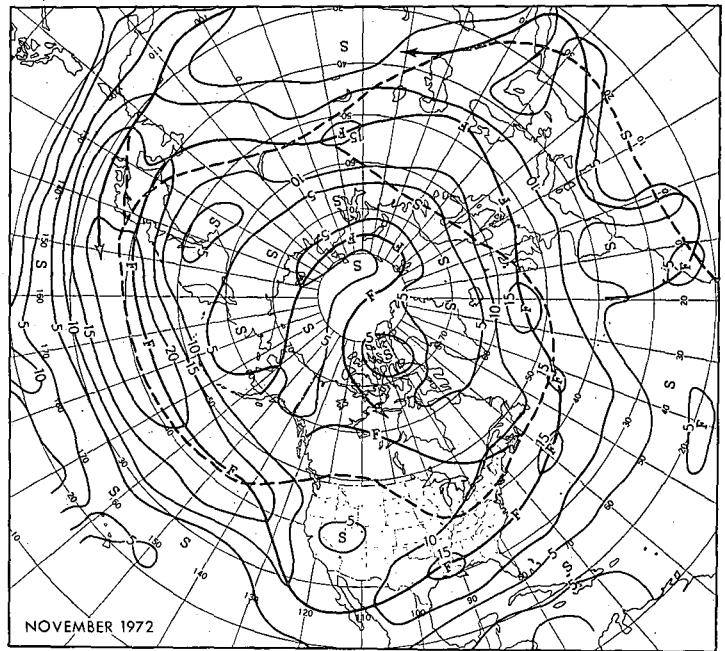


FIGURE 4.—Mean 700-mb geostrophic wind speed (m/s) for November 1972. Solid arrows show the observed axes of maximum wind speed, and dashed lines show the normal.

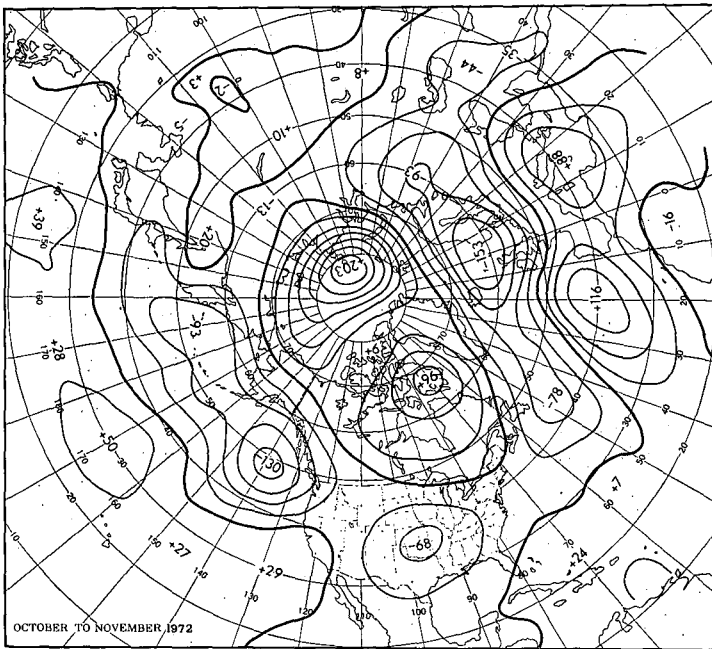


FIGURE 3.—Mean 700-mb height anomaly change (m) from October to November 1972.

Progression of a deep, mean trough into the western Atlantic was accompanied by the weakening of the trough near Spain. Over Europe, as over North America, the west-lies were strong and displaced well south of normal.

## 2. TEMPERATURE

Below-normal temperatures were observed over most of the conterminous United States this month (fig. 5) in response to the combined effects of the amplified ridge

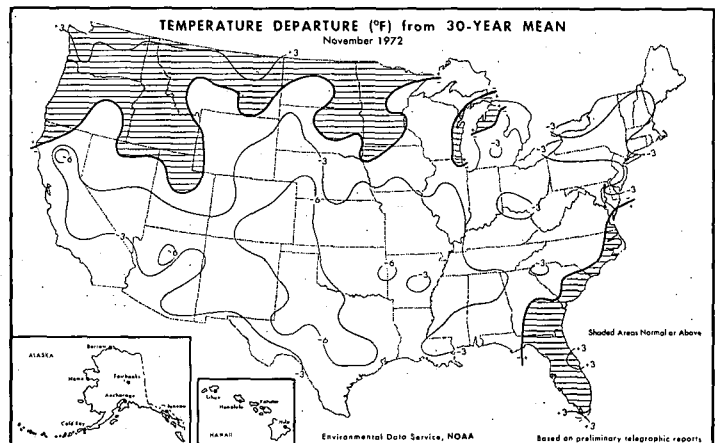


FIGURE 5.—Departure from normal of average surface temperature (°F) for November 1972 (from Environmental Data Service and Statistical Reporting Service 1972).

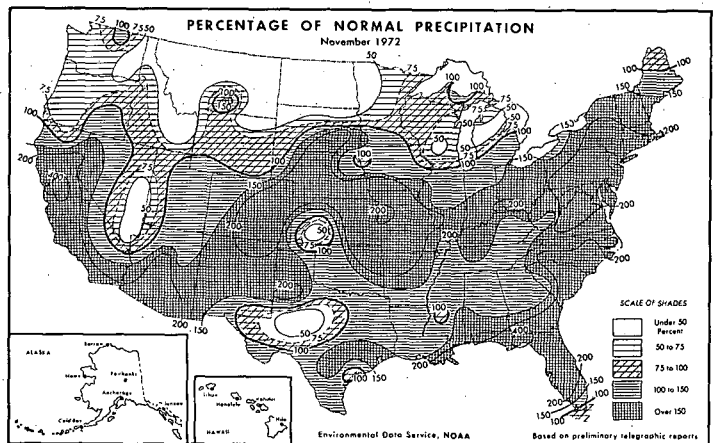


FIGURE 6.—Percentage of normal precipitation for November 1972 (from Environmental Data Service and Statistical Reporting Service 1972).

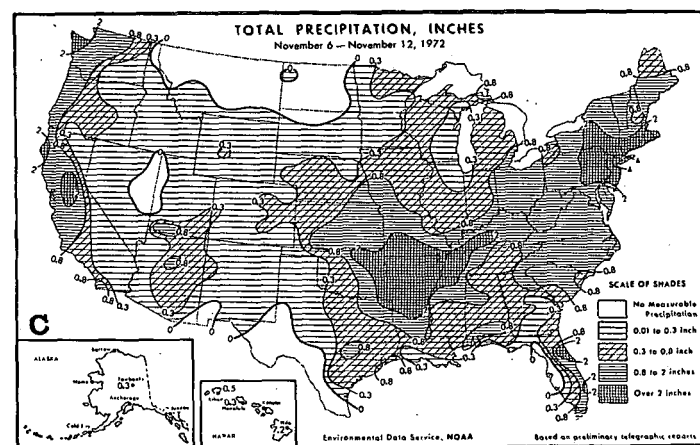
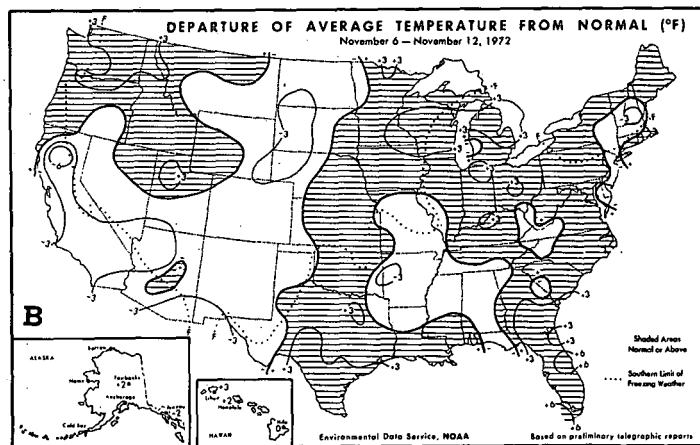
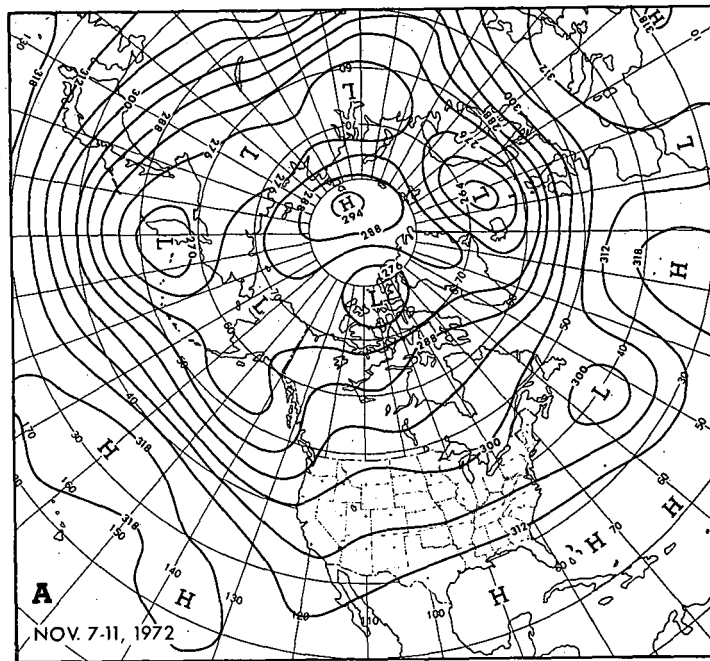


FIGURE 7.—(A) mean 700-mb contours (dam) for Oct. 31–Nov. 4, 1972; (B) departure from normal of average surface temperature (°F) and (C) total precipitation (in.) for week of Oct. 30–Nov. 5, 1972 (from Environmental Data Service and Statistical Reporting Service 1972).

FIGURE 8.—Same as figure 7, (A) for Nov. 7-11, 1972; (B) and (C) for week of Nov. 6-12, 1972.

over northwest Canada and Alaska and the deep troughs over and east of the United States (figs. 1, 2). One of the coldest Novembers of record was reported at scattered stations from the Southwest to New England. Above-

normal temperatures were confined to peripheral areas. Stronger than normal southerly flow at the surface accompanied the warmth in the Northwest while southwesterly anomalous flow at 700 mb was observed in the Southeast. The amplified Alaskan ridge also brought above-normal temperatures to most of that state.

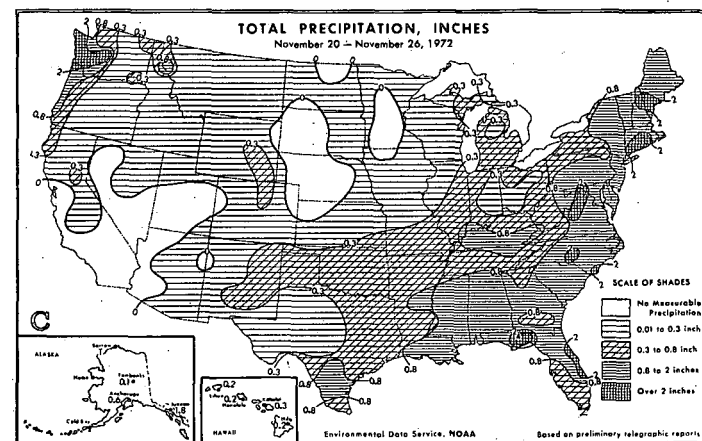
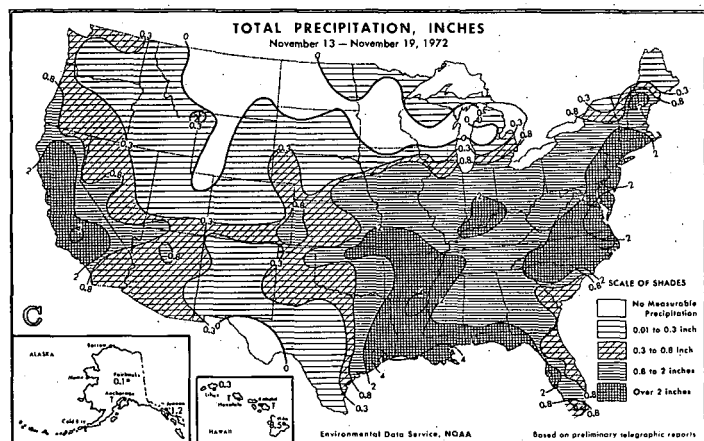
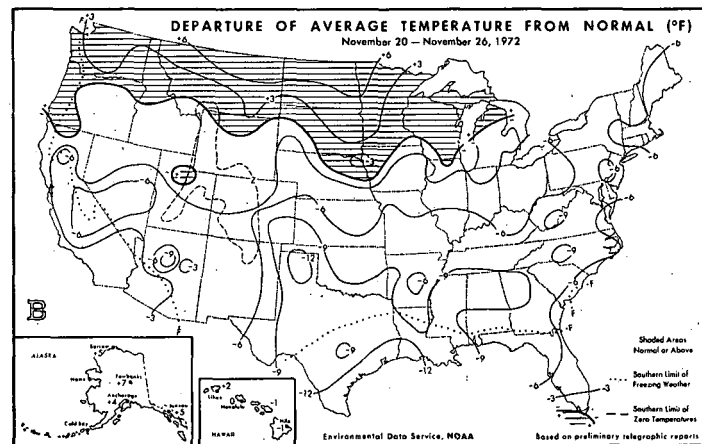
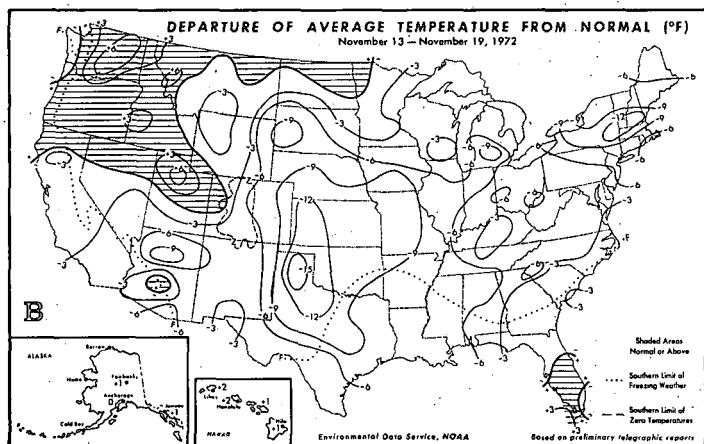
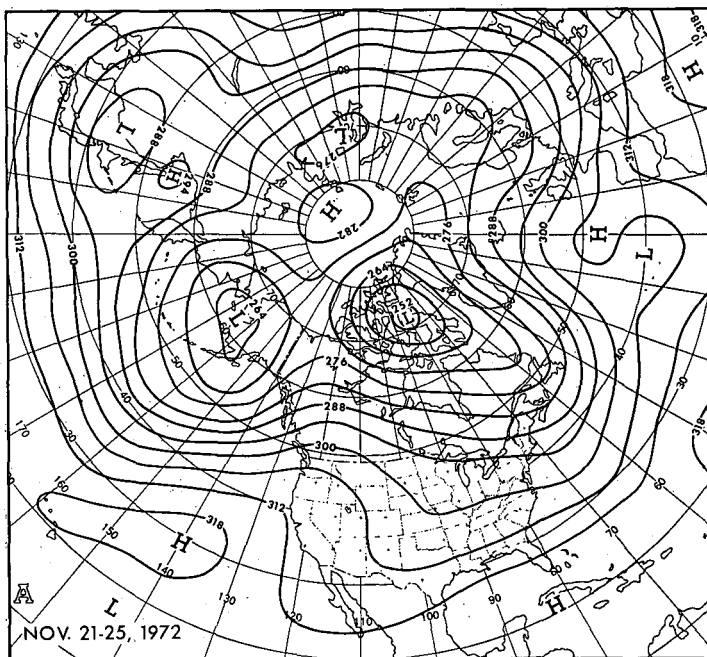
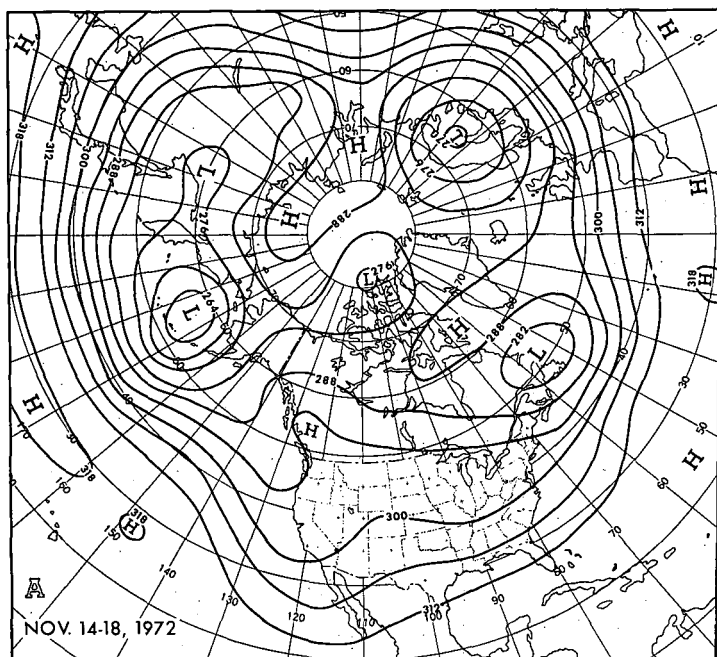


FIGURE 9.—Same as figure 7, (A) for Nov. 14-18, 1972; (B) and (C) for week of Nov. 13-19, 1972.

FIGURE 10.—Same as figure 7, (A) for Nov. 21-25, 1972; (B) and (C) for week of Nov. 20-26, 1972.

### 3. PRECIPITATION

As implied in the distributions of the height anomalies (fig. 2) and the upper level westerlies (fig. 4), the storm track over the United States was very active this month and was displaced south of normal. This brought above-normal precipitation to most of the Nation (fig. 6).

Record or near-record November totals were observed along the east coast from Florida to southern New England. This was also one of the cloudiest Novembers of record from eastern portions of the Northern and Central Plains through the Midwest to the Appalachians. Widespread, relatively dry conditions were found only from the

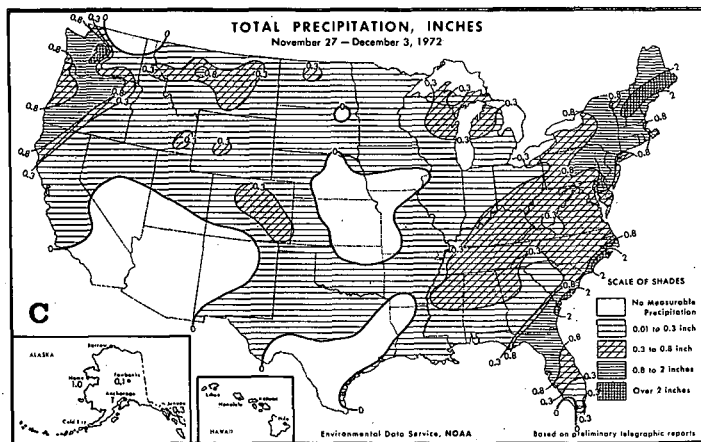
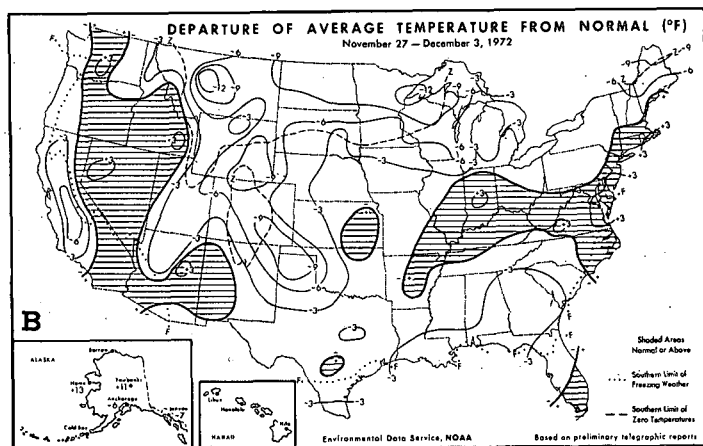
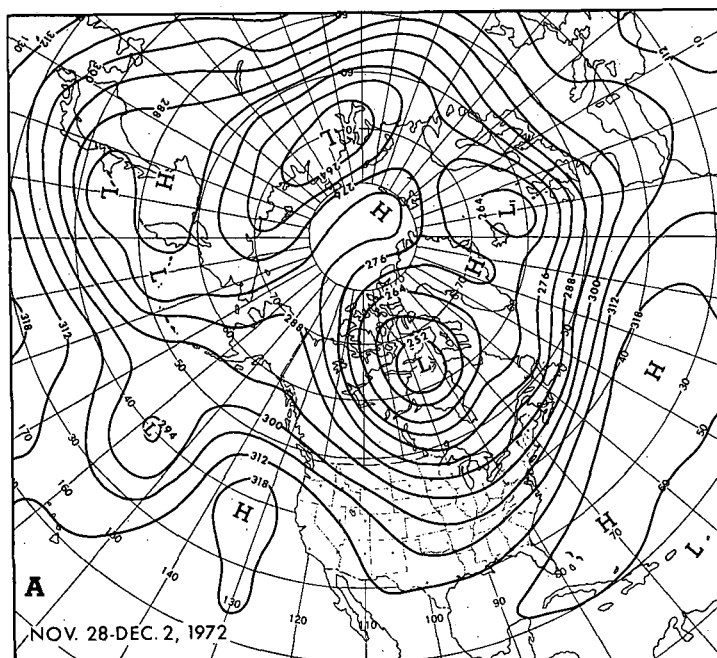


FIGURE 11.—Same as figure 7, (A) for Nov. 28-Dec. 2, 1972; (B) and (C) for week of Nov. 27-Dec. 3, 1972.

upper Great Lakes to the Pacific Northwest, well to the north of the prevailing storm track. The strong upper level ridge over Alaska limited above-normal precipitation in that State to the Aleutians.

#### 4. VARIABILITY WITHIN THE MONTH

Weekly distributions of temperature and precipitation accompanied by appropriate 5-day mean 700-mb maps are shown in figures 7-11. Amplification of high-latitude ridges, already started at the beginning of the month (fig. 7), reached its greatest extent at midmonth (fig. 9) over Alaska, the Davis Strait, and the Taymyr peninsula. During this interval, cold air was increasingly displaced southward, inducing vigorous Lows and fast westerlies at middle and low latitudes (figs. 7-9). During the last part of the month (figs. 10, 11), midlatitude mean circulation features were amplifying, and the polar High was eroding. The former, embedded in relatively fast westerly flow, were generally progressive throughout the month.

The succession of troughs and ridges crossing the United States brought variable temperatures. Cold air was confined to the West behind a Great Plains mean trough early in the month (fig. 7), but spread eastward at midmonth as a strong mean trough traversed the East (figs. 9, 10). Record warmth for so late in the season occurred along the Carolina coast on November 3, and record cold for so early followed in New England on November 16 and 17. Temperatures exceeded normal in the Pacific Northwest and along the northern border west of the Great Lakes during much of the month, accompanying first a deep coastal trough (figs. 8, 9) and then a moderately strong ridge (fig. 10). By the end of the month, an amplifying ridge off the west coast was bringing cooler air to the Northern Plains.

Precipitation was widespread during each week of the month as storm systems embedded in the fast westerlies rapidly crossed the country. Heaviest precipitation areas were generally located in the vicinity of progressive mean troughs. By the end of the month (figs. 10, 11), an amplifying ridge had replaced the previous mean trough off the west coast and the wet regime in the West was interrupted.

#### REFERENCES

- Environmental Data Service, NOAA, U.S. Department of Commerce, and Statistical Reporting Service, U.S. Department of Agriculture, *Weekly Weather and Crop Bulletin*, Vol. 59, Nos. 45-50, Nov. 6, 13, 20, 27, and Dec. 4 and 11, 1972.
- Taubensee, Robert E., "Weather and Circulation of October 1972—Record October Precipitation in the Southwest," *Monthly Weather Review*, Vol. 101, No. 1, Jan. 1973, pp. 85-90.